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## CHAPTER 15

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# Trauma, PTSD, and Physical Health

### *Clinical Issues*

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Although the relationship between stress and physical health has a fairly rich empirical history (Selye, 1955), the literature on explicit examination of the impact of trauma and posttraumatic stress disorder (PTSD) on physical health is much younger. However, since the previous edition of this volume, research examining the interaction between trauma, PTSD, and physical health has expanded considerably; so much so that an exhaustive review of this work might make for a book in its own right. Thus we aim here to distill this expanding literature down to the most essential concepts that have a bearing on clinical research, clinical assessment, and treatment planning in service delivery settings.

Indeed, when examining how trauma, PTSD, and physical health relate to one another, one need not think about the matter long before a number of interesting questions are raised: Does the experience of psychological trauma have an adverse effect on physical health? Is the relationship between trauma and physical health mediated by one's response to that trauma (i.e., PTSD)? Can receiving a terminal medical diagnosis serve as a criterion A stressor in the same manner as time-limited events such as rape or combat? As one might gather from these questions, this chapter aims to cover two conceptual areas. First, we examine how trauma and PTSD may play a causal role in instigating poor health outcomes. Second, we discuss how psychiatric disturbance, PTSD in particular, manifests in the aftermath of medical events.

## TRAUMA AND PTSD AS CAUSAL AGENTS IN POOR PHYSICAL HEALTH

Early papers on this topic were largely descriptive in nature; however, several recent review papers have outlined conceptual models that are driving empirical work in this area in a more theoretical way (Schnurr & Jankowski, 1999; Schnurr & Green, 2004). We briefly outline a theory proposed by Schnurr and colleagues that lays out a causal model for explaining trauma, PTSD, and physical health relationships. Then we review the empirical evidence that bears on the model.

In short, the model is based on the premise that the experience of psychological trauma in and of itself rarely leads directly to poor health outcomes. The exception to this is cases in which physical injury or other biological insult occurs in conjunction with the psychological trauma; for example, in motor vehicle accident victims or prisoners of war. The model specifically asserts that psychological trauma that is profound enough to result in psychiatric disturbance—operationally defined as a PTSD diagnosis—results in concomitant behavioral, physiological, and attentional changes that tax the physical capacity of the individual to adaptively cope with his or her environment in a manner that promotes good physical health. In this respect, PTSD is seen as the major mediator between trauma exposure and health outcomes (as assessed by a variety of methods). Indeed, as can be seen in the literature reviewed herein, both trauma exposure and PTSD bear negative correlations with a variety of measures of health. The model explicitly predicts this, as trauma exposure is a prerequisite condition for the development of PTSD. As such, studies that find either trauma exposure or PTSD to be correlated with physical health are concordant with the model. However, the strongest test of the model is undertaken when both trauma and PTSD are measured simultaneously in quantitative analysis and PTSD accounts for a large portion of the statistical variance in the relationship between trauma and health (Taft, Stern, King, & King, 1999).

This model regards the behavioral and physiological disturbances known to accompany PTSD as processes that contribute to allostatic load, a concept noted by McEwen (2000). Allostatic load is a construct related to the amount of deviation from homeostasis in repeated adaptations to stress, which thereby taxes biological systems in an organism. In this respect, the physiological disturbances (e.g., potentiated cardiovascular responding to stress) and the behavioral disturbances (e.g., excess alcohol consumption) that often accompany PTSD present challenges to the maintenance of homeostasis in the organism and facilitate poor health status. A fuller explication of the model is beyond the scope of this chapter. More explicit details of this model can be found in Schnurr and Green (2004). In addition, more explicit details of PTSD and allostatic processes can be found in Friedman and McEwen (2004). We now turn to the empirical evidence in support of the model.

## Self-Reported Health

In recent years, several empirical papers have emerged that suggest that having chronic PTSD places one at risk for poor physical health in a number of organ systems (Boscarino, 1997; Boscarino & Chang, 1999). Although studies also offer compelling evidence that trauma exposure correlates with health outcomes (Felitti et al., 1998; Golding, Cooper, & George, 1997), it appears that much of this relationship is mediated by psychiatric disturbance, most notably PTSD, in the aftermath of such trauma (Friedman & Schnurr, 1995; Schnurr & Jankowski, 1999). Specifically, among studies that examine indices of trauma exposure only (i.e., no assessment of PTSD) and indices of physical health, the general finding is one of poorer health among those who are trauma exposed than among comparable groups of individuals with no trauma history (e.g., Felitti et al., 1998). However, when studies examine the effect of both trauma exposure and PTSD on physical health, they generally find that PTSD mediates much of the relationship between trauma exposure and indices of physical health (Boscarino & Chang, 1999). Thus we focus primarily on the relationship between PTSD and physical health.

Data demonstrating a link between PTSD and physical health come from a variety of research methodologies. For example, in descriptive studies in which self-report measures of physical health are obtained, individuals with PTSD report a greater number of specific symptoms (e.g., back pain), diagnostic conditions (e.g., hypertension), and impairment relative to comparable groups without PTSD (Beckham et al., 1998; Kulka et al., 1990; Wagner, Wolfe, Rotnitsky, Proctor, & Erikson, 2000). In addition, evidence suggests that individuals with PTSD rate the level of role-functioning impairment associated with physical morbidity as greater than do either the general population or other psychiatric groups (Zatzick et al., 1997; Zayfert, Dums, Ferguson, & Hegel, 2002).

Although comparisons in such studies are generally made between individuals with PTSD and well-adjusted comparison groups, recent data such as those presented by Zayfert et al. (2002) suggest that PTSD imparts a negative impact on perceived physical health at a greater magnitude than other psychiatric disorders known to correlate with physical health outcomes. Moreover, these data are consistent with studies that have examined the impact of PTSD on harder health end points (e.g., myocardial infarction). That is to say, studies also suggest that PTSD has a more negative impact on health than other anxiety or affective disorders when assessed via objective indicators (Boscarino & Chang, 1999), a point we return to shortly.

In a particularly large study, the Centers for Disease Control and Prevention's Vietnam Experiences Study, it was found that a lifetime diagnosis of PTSD was associated with increased risk of self-reported cardiovascular disorders, infectious diseases, respiratory disorders, digestive conditions, and endocrine/metabolic disorders (Boscarino, 1997). Although most studies of this sort have been done with male veterans, a study with Australian firefighters

revealed a very similar pattern of findings to those from the CDC study (McFarlane, Atchinson, Rafalowicz, & Papay, 1994), as did a study with female veterans with PTSD (Wolfe, Schnurr, Brown, & Furey, 1994). In addition to Wolfe et al. (1994), other studies that have utilized exclusively female samples to examine the relationship between PTSD and self-reported health have also consistently found that PTSD is associated with poorer ratings of health (Kimerling, Clum, & Wolfe, 2000; Zoellner, Goodwin, & Foa, 2000).

### Physician-Diagnosed Medical Problems

In a complementary line of investigation, physician-diagnosed medical problems are found to be more frequent among those who carry a diagnosis of chronic PTSD relative to comparison groups without PTSD (Beckham et al., 1998; Boscarino & Chang, 1999; Schnurr, Spiro, & Paris, 2000). The study by Schnurr et al. (2000) is noteworthy because of its longitudinal design. In a long-term follow-up of World War II and Korean War veterans ( $N = 900$ ), the authors found that the presence of significant PTSD symptoms was associated with elevated rates of arterial, lower gastrointestinal, dermatological, and musculoskeletal conditions. Boscarino and Chang (1999) found that PTSD was associated with myocardial infarction and atrioventricular conduction problems as assessed by electrocardiogram (ECG) findings.

Studies of clinical samples with chronic PTSD also suggest elevated rates of physical morbidity relative to what one would expect in the general population. For example, both Beckham et al. (1998) and Buckley, Mozley, Bedard, Dewulf, and Greif (in press) have found elevated rates of physician-diagnosed medical problems in individuals presenting for mental health treatment in PTSD clinics within Veterans Affairs Medical Center hospitals. It is important to note that studies in this domain routinely control for potential variables such as years of cigarette smoking, age, body mass, and other well-established predictors of health when examining the effect of PTSD. Even after accounting for such variables, the effect of PTSD on physician-diagnosed medical problems remains statistically robust (Beckham et al., 1998; Schnurr & Spiro, 1999; Schnurr et al., 2000).

### Health Care Utilization

As one might expect from the literature reviewed, a population that is at higher risk for physical morbidity is certainly bound to use more health-care services than the general population. Recent data certainly support this point. In fact, when one considers that PTSD is among the most prevalent psychiatric disorders (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995) and that the rate of health-care utilization for physical morbidity among individuals with PTSD is greater than for most other psychiatric conditions (Greenberg et al. 1999; Schnurr, Friedman, Sengupta, Jankowski, & Holmes, 2000), the cost to the health-care system is quite large.

Studies in this domain suggest that relative to both nonpsychiatric controls and other psychiatric comparison groups, PTSD is associated with elevated rates of health-care utilization for physical morbidity (Deykin et al., 2001; Greenberg et al., 1999). For example, using case-control methods, Deykin et al. (2001) found that among a group of veterans classified as high utilizers, the rates of PTSD were markedly elevated relative to a group of individuals classified as low utilizers. Importantly, the authors of this study excluded health-care visits to mental health clinics in their analysis. They also excluded medical interventions that required multiple visits (e.g., dialysis) in their categorization of utilization. After such controls, PTSD still bore a correlation to overall utilization rates. In a related vein, Walker et al. (2003) reported on 1,225 women in a large metropolitan health maintenance organization and found that among women with high levels of PTSD symptoms the health-care costs were nearly double those of women with low PTSD symptom levels. Although this study included mental health costs in the analyses, an itemized analysis according to health-care specialty revealed that the effect for utilization held up in non-mental-health sectors. These studies are concordant with a larger literature documenting that individuals who are victims of sexual crimes or battery use health-care resources at greater rates (for physical morbidity) relative to comparable groups of nontraumatized individuals (e.g., Koss, Woodruff, & Koss, 1991; Norris, Kaniasty, & Scheer 1990).

### **PTSD in Specialty Health Clinics**

To this point, we have reviewed studies that seek to address the relationship between PTSD and physical health by examining groups that differ in their psychiatric status. That is to say, these studies examine health indices as a function of PTSD-positive or PTSD-negative status (e.g., Buckley & Kaloupek, 2001). Another manner in which to examine the link between trauma, PTSD, and health is to examine the rates of trauma and PTSD among individuals with known medical diagnoses (e.g., HIV) vis-à-vis comparison samples who are physically well. Generally speaking, there is much less of this type of research, and definitive statements cannot be drawn at this time. However, there is some evidence to suggest that the rates of trauma and PTSD are elevated among patients seeking care in medical specialty clinics. This is true for sexually transmitted diseases (Kimerling et al., 1999), functional gastrointestinal problems (e.g., IBS; Delvaux, Denis, & Allemand, 1997), pain conditions (Goldberg, 1994), and HIV (Allers & Benjack, 1991).

### **Summary of PTSD and Physical Health Studies**

These multiple areas of investigation point in unison to the fact that having a diagnosis of PTSD is a risk factor for physical morbidity and that the effect does not seem constrained to one organ system (Friedman & Schnurr, 1995; Schnurr & Jankowski, 1999). In light of these findings, investigators have be-

gun searching for causal mechanisms that may account for the PTSD and physical health correlation. In the sections to follow, we review potential mechanisms of action that may account for this relationship. A comment worthy of note before proceeding, however, is that in such research one needs to account for physical health problems associated with index trauma, in addition to those that develop over time in conjunction with mental health disturbance. Specifically, it is tempting to attribute much of the physical morbidity seen in PTSD populations to the trauma itself rather than to PTSD. Given the often-violent nature of trauma, it is not uncommon for individuals to experience injury and biological insults during the course of their trauma, which may result in longer term health problems. Indeed, some of the PTSD–physical health morbidity correlation is accounted for by this phenomenon. However, longitudinal studies and studies wherein trauma exposure is controlled suggest that the majority of the variance in the PTSD–physical health relationship is not accounted for by physical injury incurred at time of the index trauma (see Friedman & Schnurr, 1995; Schnurr & Jankowski, 1999).

### **MECHANISMS OF ACTION LINKING PTSD TO PHYSICAL HEALTH**

Broadly speaking, two processes hold the most promise in terms of explaining the PTSD–physical health correlations. That is to say, two processes seem to play the most profound role in allostatic load among individuals with PTSD. First, some have hypothesized that, due to the “stress reactive” nature of PTSD, continual engagement of the physiological stress response system places individuals with chronic PTSD at risk for the progression of health problems. More specifically, some have asserted that repeated responding to stressors with augmented sympathetic nervous system output and disturbed HPA-axis functioning places individuals with PTSD at undue risk for physical morbidity (Buckley & Kaloupek, 2001; Friedman & McEwen, 2004). Indeed, several laboratory studies suggest that individuals with PTSD show augmented sympathetic responses to stress challenges relative to control groups (Blanchard & Buckley, 1999). The second of the two allostatic processes involves the greater frequency of adverse health behaviors (e.g., smoking, lack of exercise, etc.) that seem to be more prevalent among individuals with PTSD than in those without PTSD.

#### **Physiological Disturbances in PTSD**

A compelling line of research suggests that the two major arms of the stress response system are disrupted among individuals with PTSD; namely, the sympathetic nervous system and the hypothalamic–pituitary–adrenocortical (HPA) axis. These disturbances can play a role in the progression of disease processes and, indeed, correlate with other physiological mechanisms consid-

ered surrogate measures of health. For example, elevated basal catecholamine levels (McFall, Veith, & Marburg, 1992) and abnormal hypothalamic-pituitary-adrenal (HPA) functioning (Yehuda, Giller, Southwick, Lowy, & Mason, 1991) have been noted, such that individuals with PTSD will show augmented sympathetic reactivity to stress provocation. A large literature supplements these studies and documents that, when exposed to trauma cues, individuals with PTSD showed greater sympathetic arousal (as indexed by greater heart rate and skin conductance reactivity) than both traumatized and nontraumatized comparison groups without PTSD (Blanchard et al., 1996; Keane et al., 1998). Such physiological disturbances have been considered mechanisms of disease progression for cardiovascular problems. Indeed, chronic PTSD has been associated with elevated resting heart rate (Buckley & Kaloupek, 2001), ECG-determined presence of nonfatal myocardial infarction (Boscarino & Chang, 1999), and low heart rate variability (Cohen et al., 1997). In total, such findings suggest that allostatic processes might hold explanatory power in addressing the PTSD-health correlation (Friedman & McEwen, 2004).

Many of these findings are particularly noteworthy with respect to their relationship to cardiovascular health. The findings of low-heart-rate variability (Cohen et al., 1997) and elevated basal heart rate (Buckley & Kaloupek, 2001), respectively, suggest that among individuals with chronic PTSD there may be an increased rate of premature mortality due to cardiovascular disease. Although some data support this proposition (Boscarino & Chang, 1999), longer term prospective studies with chronic samples are needed to further evaluate this prediction. In short, most studies that examine surrogate measures of health or statistical predictors of mortality have found that PTSD has a negative effect on health status.

## Health Behaviors

The second proposed mechanism that might link PTSD to physical health outcomes is the comorbidity of PTSD with adverse lifestyle behaviors (Schnurr & Spiro, 1999). Indeed, a number of different health behaviors, both adverse and preventive, might provide a mediational link between PTSD and markers of health (cardiovascular health in particular). For example, PTSD is associated with high rates of alcohol abuse and dependence comorbidity (e.g., Kessler et al., 1995; Kulka et al., 1990). It is well documented that alcohol consumption of greater than three drinks per day is associated with increased blood pressure and heart rate, as well as with increased mortality from coronary artery disease and stroke (Hillbom & Juvela, 1996). PTSD is also associated with markedly elevated rates of nicotine use (Lasser et al., 2000). These influences point to ways in which PTSD can have an indirect relationship on cardiovascular health (Schnurr & Spiro, 1999).

A question invariably raised by many studies that examine PTSD and adverse health behaviors such as smoking is the question of whether PTSD pre-

disposes one to substance abuse or whether substance abuse and dependence increase risk for trauma exposure and PTSD. Research generally supports the former notion (Stewart & Conrod, 2003). That is to say, when PTSD and substance use are comorbid, it is most often the case that the PTSD diagnosis pre-dates the substance-use-disorder diagnosis. Such findings support the notion that individuals with PTSD often use substances for affect regulation purposes. In a particularly well-done prospective study on this matter, Breslau, Davis, and Schultz (2003) followed more than 1 thousand 21- to 30-year-olds over a 10-year period of time to assess the longitudinal course of trauma exposure and PTSD. Among individuals with PTSD at study entry, the 10-year incidence of nicotine use and illicit substance use was much greater than among trauma-exposed individuals without PTSD and individuals not exposed to trauma. Studies such as those cited here suggest that the onset of PTSD often precedes the adoption of unhealthy lifestyle habits that put one at risk for physical morbidity.

Although most examinations of PTSD and health behaviors have focused on adverse health behaviors (e.g., smoking), few have looked at preventive health behaviors (e.g., exercise). In a recent study, however, Buckley et al. (in press) found that individuals with PTSD had poor sleep hygiene habits, exercise habits, and other general self-care habits relative to what would be considered appropriate by contemporary health-care recommendations.

### **Trauma, PTSD, and Sexually Transmitted Disease Risk**

Several studies suggest that exposure to trauma and PTSD elevates the risk for engaging in behavior that facilitates the spread of sexually transmitted diseases. For example, Stiffman, Dore, Earls, and Cunningham (1992) found an association between PTSD and higher incidence of risk behaviors. In a related vein, Rotheram-Borus, Koopman, and Bradley (1989) found odds ratios of 5.9 that youths with symptoms of PTSD would use intravenous drugs. Similar conclusions have been reached in studies that examine trauma exposure and HIV-risk behavior (Cunningham, Stiffman, Dore, & Earls 1994). These studies suggest that having PTSD places one at risk for the acquisition of communicable disease via risky health behaviors that are entirely preventable.

### **PTSD and Adherence to Medical Regimens**

Another way in which PTSD might affect physical health outcomes is via its effect on adherence to medical regimens. Specifically, the presence of PTSD may very well impede adherence to prescribed medical regimens for the primary physical problem that is associated with PTSD, thereby increasing risk for serious adverse events or even mortality due to lack of medical compliance. Although not much work has been done in this regard, it is worthy of comment here, as it is an area in need of further investigation. (Although a lit-



erature exists on the association of many psychological factors and their role in nonadherence, we focus exclusively on PTSD.)

A study by Shemesh et al. (2001) points to the importance of assessing for PTSD in the context of ongoing medical care for life-threatening problems. In following a group of patients after myocardial infarction (MI) who were being treated with captopril (an angiotensin-converting enzyme [ACE] inhibitor often prescribed for severe post-MI), the authors found that PTSD symptoms related to the index MI were negatively associated with adherence as assessed by pill counts at follow-up. Although correlational, this finding is compelling because lack of compliance with captopril was associated with mortality during follow-up.

Similar findings regarding the relationship of PTSD to compliance with medical regimens has been noted for individuals who are positive for HIV and who receive psychiatric care in outpatient AIDS clinics (Cohen, Alfonso, Hoffman, Milau, & Carrera, 2001) and for those who receive treatment for heroin dependence (Hien, Nunes, Levin, & Fraser, 2000). Studies such as these suggest that even if individuals are being treated for a primary medical problem, screening for trauma exposure and PTSD should be considered (and extensively followed if necessary), as the presence of such problems may compromise adherence to medical regimens.

## Discussion of PTSD and Physical Health Findings

As one can see, allostatic processes have intuitive and empirical appeal in explaining the PTSD–physical health correlation. In fact, based on the extant empirical literature, one can make a case that it is probably a combination of both stress-induced physiological disturbances and a profile of adverse lifestyle behaviors common to PTSD that accounts for the PTSD and physical morbidity correlations. The work that has examined the impact of PTSD on physical health suggests that the average level of overall self-care and physical morbidity among individuals with PTSD is quite poor. This conclusion is based on the high rate of endorsement of health risk behaviors (e.g., smoking and alcohol abuse), the relatively low frequency of preventive health behaviors such as exercise and medical screening, findings of basal and stress-induced physiological disturbances, and a higher incidence of specific medical conditions relative to the general population. Moreover, the amount of role-functioning impairment and health-care utilization for physical morbidity is markedly elevated in this psychiatric population (Walker et al., 2003; Zayfert et al., 2002).

With respect to the clinical relevance of the findings reviewed thus far, the data suggest that, although individuals with PTSD present to mental health settings seeking psychiatric treatment for PTSD symptoms, assessment of physical morbidity and lifestyle behaviors is an issue that warrants attention from a treatment planning perspective. It is not uncommon for individu-

als with chronic PTSD to need services from several medical subspecialties concurrently. Data such as these also suggest that educational and behavioral interventions aimed at health promotion (wellness groups) may have a role in the secondary prevention of physical morbidity in this high-risk population.

It is important to consider that, above and beyond structured interview and self-report inventories of psychiatric symptoms, inclusion of assessment materials that bear on self-care, health behaviors, and role-functioning impairment are important to consider when doing evaluations with trauma survivors. Certainly much of this can be accomplished with open clinical interviewing, but instruments are available that can also serve this purpose well. The Short Form-36 (SF-36; Ware, Snow, Kosinski, & Gandek, 1997) for example, serves as a useful adjunctive measure to gauge role functioning impairment due to physical morbidity and pain problems. The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) can be used as a quantitative measure of recent alcohol use. It has been used to screen for alcohol problems and performs well across genders and racial groups. Likewise, the Drug Abuse Screening Test (DAST; Skinner, 1982) is a 10-item screening instrument developed by the Addiction Research Foundation that indicates the degree of drug abuse-related problems over the previous 12 months (Skinner, 1982). These measures, and others similar to them, should be considered in the context of doing PTSD evaluations that also involve the administration of instruments geared at more traditional psychiatric symptoms.

### MEDICAL ILLNESS AS A CRITERION A EVENT

In examining the historical roots of PTSD, the diagnosis has focused on individuals' responses to discrete events of a horrific nature that are no longer threatening in the present time. For example, long before the diagnosis of PTSD was formally recognized in DSM-III (American Psychiatric Association, 1980) terms such as "shellshock" described psychiatric disturbances that were linked to exposure to a life-threatening event that occurred in the past (combat). Such clinical descriptions map closely to the current DSM-IV (American Psychiatric Association, 1994) construct of PTSD. In the early stages of research on PTSD, such conceptualizations of the stressor criterion and the concomitant psychiatric disturbance continued with an exclusive tendency toward examining psychiatric disturbance in response to discrete events, most notably rape and combat exposure.

In recent years, however, interest has been increasing in the possibility that receiving medical diagnosis of a life-threatening illness (e.g., lung cancer) may serve as a criterion A stressor. Stressors such as this have been labeled "information stressors" by Green and colleagues (Green et al., 1998), as they differ from more "classically" defined criterion A stressors that involve acute and imminent threat to life and physical integrity. Indeed, DSM-IV explicitly

allows for such a stressor (receiving a medical diagnosis) to serve as the foundation for a PTSD assessment and subsequent diagnosis (American Psychiatric Association, 1994). With this explicit recognition in DSM-IV, one might conclude that any argument over whether such events are capable of producing comparable patterns of psychiatric disturbance relative to more "classic" criterion A traumas is a moot point. However, we submit that the debate is far from resolved.

The applicability of PTSD as a psychiatric construct to individuals diagnosed with chronic or terminal medical illnesses is complicated because of the ambiguity of the stressor (Kangas, Henry, & Bryant, 2002). More specifically, it is difficult to disentangle the effects of receiving the diagnosis from ongoing, and often aversive, medical treatment, as well as future-oriented concerns about recurrence and mortality. By way of contrast, assessing PTSD symptoms in response to a single-index event (e.g., motor vehicle accident) allows one to anchor symptom onset and changes to a single point in time. Such single-index traumas also allow for relatively straightforward determinations of pathological processes in patients from whom imminent threat regarding their trauma is long over. However, how does one easily resolve such assessment questions with cancer survivors? Is it appropriate to consider "sense of foreshortened future" as a "psychiatric" symptom in an individual recently diagnosed with breast cancer? Certainly such a phenomenon would seem to be different from a sense of foreshortened future for a physically healthy individual who witnessed a physical attack on someone else several years prior. Sticking with the breast cancer example, how might one go about determining whether or a person is having difficulty with PTSD-related reexperiencing symptoms or is appropriately worrying about future-oriented outcomes of having the cancer diagnosis?

### **Life-Threatening Illness as a Criterion A Stressor**

There are two fundamental ways in which life-threatening illness is different from more traditional stressors. First, the threat from such events is not from the external environment, as in events such as disasters, rape, combat, and automobile accidents. Rather, it arises internally, so that the threat and the individual cannot be separated. This fact may make the experience qualitatively different from one in which the threat arises from the outside. Second, once a person has been treated for his or her illness and survived, the ongoing stressor may not be the memory of the past event but rather the threat that in the future the illness may recur or be exacerbated, with death resulting. Conceptualized this way, the threat is not primarily in the past but in the future. With the exception of such illnesses as MI or seizure disorder, in which the acute onset may also be life threatening, the immediate "death encounter" in the majority of life-threatening illnesses is not experienced in the initial episode but, rather, looms ahead. This type of threat is more vague than the moment of immediately imminent death that one might experience with a mug-

ging or a rape. However, certain aspects of treatment for these illnesses, for example, surgery, may be stressful in their own right and perceived as a "death encounter."

Prior to beginning our studies of breast cancer survivors, one of us (B. L. G.) noted that the threat associated with cancer is primarily the *information* that one has the disease. In this sense, the diagnosis of cancer is similar to learning that one has been exposed to radioactive or toxic chemical contamination (Green, Lindy, & Grace, 1994). The "stressor" in these cases is the information that one has been exposed or has cancer or heart damage, which is learned after the fact. In such cases, the nature of the threat is quite vague. These differences in the nature and source of threat have important diagnostic implications. Specifically, the intrusive images and thoughts about the threat may not be actual recollections of the event(s), such as the precise moment of receiving the news that one has cancer, but more future-oriented ruminations about possible recurrence, manifestation of physical problems, or death.

## Cancer

Interest in the psychiatric impact of cancer has been an active area of research interest and funding. One of the primary reasons for this is the growing numbers of cancer survivors. With some cancers (e.g., Hodgkin's disease and testicular cancer), the vast majority of individuals treated will be cured of the illness. Most patients live for extended periods of time with the disease. To achieve these advances however, treatments have become more aggressive, lengthy, and toxic. As a result, cancer has become a chronic illness for many survivors.

A number of studies show that receiving a diagnosis of cancer causes significant psychological distress. For example, Derogatis et al. (1983) found that 47% of a cross-section of cancer patients met criteria for a psychiatric disorder, in comparison with 12–13% estimated for the general population. Although many studies examine a number of psychosocial aspects related to the cancer experience, we focus exclusively on those with a bearing on PTSD. Research in this area has generally taken the approach of measuring PTSD symptoms by way of self-report questionnaires or of more formally assessing PTSD diagnostic status with structured clinical interviews. The overwhelming majority of the studies in this area have focused on female samples of breast cancer survivors, with a few studies examining pediatric or mixed-gender adult populations (Kangas et al., 2002).

With respect to studies that examine self-reported PTSD symptoms, the majority of the studies find low to moderate numbers of individuals experiencing some level of symptoms as assessed by symptom checklists. For example, among a sample of 244 breast cancer survivors, Bleicker, Pouwer, van der Ploeg, Leer, and Ader (2000) found that 16% of the sample had high intrusive symptoms and 15% had high avoidance symptoms at 2 months postsurgery, as assessed by the Impact of Event Scale. A number of similar studies find a

range of symptom reports generally in the moderate range (e.g., Brewin, Watson, McCarthy, Hyman, & Dayson, 1998; Butler, Koopman, Classen, & Spiegel, 1999; Hampton & Frombach, 2000). Virtually dozens of studies have employed this type of methodology, and all have arrived at similar conclusions (see Kangas et al. 2002). Such studies suggest that some level of psychological distress following cancer diagnoses is quite common. However, the specificity with which these symptoms map onto the construct of the PTSD diagnosis is less clear. Specifically, among cancer survivors, appropriate future-oriented rumination is often mistaken for a "reexperiencing" symptom (Green et al., 1998). Likewise, the aversive physical side effects of both the specific disease state and the often aggressive treatment regimens can be mistakenly counted as PTSD hyperarousal symptoms. Clearly, such instances of counting symptoms toward a PTSD diagnosis are not warranted in cancer survivors. Studies that employ stricter diagnostic criteria by way of structured clinical interviews can shed light on this topic, an issue we cover in the paragraphs to follow.

Among studies that have utilized structured clinical interviews, the rates of PTSD among cancer survivors have ranged somewhat. However, it is fair to say that in the majority of studies the prevalence of diagnosable PTSD is fairly low (Kangas et al., 2002). Some studies have employed strict diagnostic criteria in an effort to disentangle symptoms that are due to physical problems and interventions related to the index diagnosis of cancer as opposed to those that are secondary to a psychiatric disturbance (Green et al., 1998). Specifically, Green et al. (1998) used decision rules that avoided counting future-oriented concerns as reexperiencing symptoms (which might result in false-positive PTSD diagnoses). In this way, they found that only 1.9% of a sample of 160 women with early-stage breast cancer would meet current PTSD diagnosis (average of 6 months posttreatment). Moreover, they found a 3% lifetime (postcancer) rate of PTSD among the same sample of women.

The findings of Green et al. (1998) are concordant with other studies that have employed structured diagnostic interviews. For example, Alter et al. (1996) found a 4% current rate of PTSD among a sample of women with mixed cancers who were on average more than 4 years posttreatment. In some studies, the rates of current PTSD have ranged as low as 0% (Mundy et al., 2000). Such findings are concordant with results from studies that use self-report instruments in sophisticated ways in order to arrive at diagnostic judgments (Cordova, Stadts, Hann, Jacobsen, & Andrykowski, 2000; Andrykowski, Cordova, McGrath, Sloan, Kenady, 2000). In total, the research with cancer survivors suggest that PTSD is possible but, fortunately, not very prevalent.

Investigators have speculated that cancer in the young may fit better (conceptually) with the PTSD stressor criterion because the threat of death is happening "off time." Studies investigating this phenomenon have looked at rates of PTSD in both children with cancer and their parents. Thus we treat these studies of pediatric cancer survivors separately.

Alter and colleagues (1992) examined the incidence of PTSD in three patient groups who were an average of about 5 years posttreatment: adolescent survivors of cancer, their mothers, and adult breast cancer survivors. As part of the multicenter DSM-IV field trial for PTSD, this was the only site that examined medical illness as a stressor event. The authors reported current and lifetime prevalence rates of cancer-related PTSD of 4% and 16%, respectively, for adult survivors (Alter et al., 1996), 30% and 46% for mothers, and 33% and 54% for adolescent survivors. No differences were found related to time since treatment or stage of illness.

An exploratory study by Stuber, Meeske, Gonzales, Houskamp, and Pynoos (1994) evaluated 30 childhood cancer survivors, 8–19 years old, who were disease-free and at least 22 months posttreatment. Participants were assessed for the presence of PTSD symptoms using the Reaction Index (RI), and they answered six questions about their subjective appraisal of the intensity and difficulty of treatment. The authors found that 5 (17%) of the survivors reported posttraumatic stress symptoms in the moderate range and that 9 (30%) had mild symptoms. Appraisal of treatment intensity was significantly correlated with severity of symptoms, although there was some suggestion that age at time of treatment moderated this effect. Symptoms in children over age 7 at the time of diagnosis appeared to be related to objective aspects of treatment (such as duration), whereas for younger children, subjective appraisal of treatment intensity was more highly related to distress. As with other studies, time since treatment, type of tumor, and perceived life threat were not significantly correlated with severity of symptoms.

Taken as a whole, current studies in this area suggest that, although PTSD can occur as a function of diagnosis and treatment of cancer in adults, it may affect only a small number of patients. The higher rates of PTSD symptomatology in pediatric cancer survivors indicate that age may be an important risk factor and may also put individuals at risk for chronic problems. The most important challenge facing the clinician in doing a psychiatric evaluation with cancer survivors is accurately differentiating between symptoms that are truly psychiatric in nature and those that are appropriate to coping with a medical illness and aversive treatment regimens. We return to this point in more detail shortly.

In summary, cancer may be qualitatively different from more traditional PTSD stressor events in a number of ways. These include the fact that the threat is internal rather than external and that it is ongoing, chronic, and future oriented. Thus the focus of the survivor is on the future rather than the past. On the other hand, many aspects overlap as well, for example, the news about having a potentially deadly illness can be sudden and unexpected, the treatment may be traumatic, and many of the mental and emotional processes for avoiding and integrating the experiences are likely similar. The anxiety and arousal associated with the information and certainly with some of the associated procedures may be quite similar, as well, along with the disruption in relationships brought on by the knowledge that one has had an experience

that others may not be able to understand or find equally frightening. Thus PTSD is possible but not very common in this population.

### **PTSD Subsequent to Myocardial Infarction**

Unlike receiving a medical diagnosis of which one had been unaware or free of symptoms, as is the case with receiving a cancer diagnosis, the experience of having a life-threatening medical problem with an abrupt onset (e.g., myocardial infarction) can be particularly frightening, with obvious imminent life threat and other defining features more typically associated with the DSM-IV criterion A definition of a traumatic stressor. As such, one might imagine that PTSD would be more likely in the aftermath of unexpected myocardial infarctions (MIs) than in response to other medical diagnoses.

Consistent with such conjecture are data presented by Ginzburg, Solomon, and Bleich (2002), who found that at approximately 7 months post-MI, roughly 15% of their sample met criteria for PTSD. Notable among their results was the fact that repressive coping style (measured less than 1 month post-MI) was negatively associated with rates of PTSD at 7-month follow-up. That is to say, those who tended to minimize the physical impact of their MI had better psychiatric adjustment. Such findings are consistent with more general emotional adjustment findings that suggest that the denial of the impact of MI seems to correlate with good emotional adjustment post-MI.

Van Driel & Op den Velde (1995) also examined the rates of PTSD in 23 consecutive admissions for first-incident MI. At the 2-year follow-up, no patients had received a diagnosis of PTSD, and only one had partial PTSD, during the first year post-MI (5 patients died during follow-up, and hence their psychiatric status was unknown). Kutz and colleagues examined PTSD symptoms in 100 patients 6 to 18 months (average 14 months) post-MI (Kutz, Shabtai, Solomon, Neumann & David, 1994), using a self-report questionnaire for PTSD symptoms. They found "probable" chronic PTSD in 16% of their sample and "probable" acute PTSD (lasting less than 6 months and not present at time of evaluation) in 9% of the sample, yielding a 25% lifetime risk. In 19 (76%) of the participants with chronic PTSD, the disorder appeared within 3 months of their MI. Prior MI, cardiac-related hospitalization, and prior PTSD of noncardiac origin increased risk of MI-related PTSD, as did greater anticipation of subsequent MI-caused disability. The strong association between concern over disability and PTSD prompted the researchers to suggest that denial or only mild apprehension at the time of MI may be adaptive in the long term. They also found that PTSD may play a central role in the tendency of this population to seek emergency medical help. Almost half (47%) of patients who reported repeated visits to emergency settings for "feeling another heart attack" met symptom criteria for PTSD, as opposed to 20% of those who did not utilize emergency medical services.

Doerfler, Pbert, and DeCosimo (1994) assessed 50 men 6 to 12 months following hospitalization for first MI or coronary artery bypass graph

(CABG) surgery using self-report methods. Using DSM-III-R criteria applied to an algorithm on self-report data, 4 patients (8%) met full criteria for PTSD. Although the researchers cautioned that corroboration using interview data was warranted, they concluded that PTSD may represent an unrecognized problem for some men who sustain an MI or undergo CABG surgery. These rates of PTSD are similar to those in other studies that examine individuals who survived acute cardiac events (Kutz, Garb, & David, 1988).

In summary, studies examining MI-related PTSD suggest that a small number of adults may be at potential risk for this disorder (although at slightly higher rates than with cancer). Although rates of PTSD associated with most life-threatening illnesses in general are too low to warrant routine screening for the disorder, MI may represent a special case. Clinical data suggest that denial in the early period post-MI may be important for recovery. Thus patients who experience acute emotional distress in this period are not only more likely to develop later PTSD but may also be at greater risk for poor recovery or death from their disease, and they should receive further evaluation. Nonetheless, the low rates of PTSD in such studies are encouraging as affective disturbance post-MI is generally predictive of increased mortality.

### ASSESSING PTSD FOLLOWING LIFE-THREATENING ILLNESS

One general concern in assessing psychological symptoms or disorders in a medical population is the differentiation between symptoms characteristic of the stress response and those typically produced by the illness or treatment. For example, pain related to surgery can cause sleeplessness and irritability. Radiotherapy and chemotherapy cause fatigue and lethargy, as well as depressed mood. Difficulty concentrating can result from a variety of treatments and medications. As with the diagnosis of other psychiatric disorders in persons with medical illnesses, it may be difficult to identify the source of the symptom. Thus, in the case of PTSD following medical illness events, the differential diagnosis is not only between PTSD and other psychiatric disorders but also between PTSD and the medical conditions that have served as the source of stress.

A second concern regarding assessment of PTSD in this context relates to potential differences in intrusive thinking. For example, Green et al. (1998) assessed PTSD via the Structured Clinical Interview for DSM-III-R (SCID). The first question on this schedule is whether the event (which was defined for participants as "your cancer diagnosis and treatment," specifically focusing on aspects that they had defined as most stressful during this period) came back to them "suddenly and vividly when you didn't want it to." About one-third of the participants in this study answered yes to this question, but, for some, the content of the images and thoughts was ruminative and future oriented,



rather than a recollection of past events. Most of these women reported thinking constantly and involuntarily about the fact that they had this potentially deadly disease. Other women had actual recollections, such as picturing the doctor telling her that her biopsy showed a malignancy or being wheeled into surgery. This distinction applied to dreaming as well. Their distress at reminders and their avoidance symptoms were similar to those found with other types of stressors.

With regard to the denial and numbing symptoms, life-threatening illness poses particular problems for the symptom of "foreshortened future." To begin with, this symptom has not been well defined in adults. In cancer populations, for example, the SCID question "has (the trauma) changed the way you think about the future?" nearly always elicited a positive response. Yet, for the most part, the changes reported seemed to indicate appropriate and healthy adaptation (e.g., enjoying the present more because the future is not guaranteed, putting one's affairs in order, talking to children about one's will). These types of responses should not count as indications of a pathological sense of foreshortened future.

With regard to the arousal symptom of hypervigilance, this often takes a different form in cancer survivors than in survivors of other types of traumas. Rather than being hyperalert to their surroundings, these individuals became hyperalert to their physical health and any bodily changes that might signal that the cancer was recurring. Thus this symptom may resemble hypochondriasis in a medically ill population. For example, participants with this symptom reported examining themselves for additional lumps, sometimes many times a day, or far more often than appropriate for routine monitoring. Hypervigilance in medical populations should be counted as a psychiatric symptom only when it appears related to fear of external environmental threats or to medical issues and is above and beyond appropriate levels of concern given the available medical data (e.g., performing several self-examinations per day for breast lumps when physician's recommendations are for examinations with considerably lower frequency).

## ASSESSMENT OF TRAUMA AND PTSD IN PRIMARY CARE

The findings just described have important implications for assessment. Clearly, individuals who have been traumatized and those with PTSD make disproportionate use of the medical system. They are more likely to be seen in health-care settings than their nonexposed counterparts and more likely to be seen in primary care or medical emergency settings than in the mental health sector. Thus, as Kamerow, Pincus and MacDonald (1986) suggest, the primary care setting is a potentially useful one in which to identify and assess potential trauma victims so that they will receive appropriate care.

Given the high prevalence of trauma survivors in medical settings, primary care providers should be trained to be sensitive to the presence of trauma.

ma exposure in their patients. A trauma history should be an integral part of medical history taking and is especially important in persons with high distress and/or in those who are frequent users of health-care resources. Because of the high-risk health behaviors frequently engaged in by those with trauma and PTSD, screening for these behaviors may be useful as well. Identifying those at risk for poor health and threatening health practices is an essential ingredient in any intervention strategy.

In spite of these findings, however, a number of studies have now documented low rates of inquiry even about ongoing or current domestic violence in primary care settings (e.g., Rodriguez, Bauer, McLoughlin, & Grumbach, 1999). And qualitative studies suggest that female patients may be hesitant to disclose violence when physicians do not ask (Bauer, Rodriguez, Quiroga, & Flores-Ortiz, 2000). This combination suggests that current violence is likely to go undetected without explicit efforts on the part of the provider to inquire. Past trauma is even less likely to be addressed, yet most patients favor routine inquiry about prior sexual and physical abuse (Friedman, Samet, Roberts, Hudlin, & Hans, 1992).

Although it is tempting to suggest that one or two general questions could be used by busy physicians to do a quick screening in these settings, this approach has a number of drawbacks. It is clear at this point, first, that use of words such as "rape," "abuse," and so forth, reduce endorsement, as individuals may be reluctant to label as abusive those acts committed by known others such as parents or boyfriends (Resnick, Falsetti, Kilpatrick & Freedy, 1996). These terms are not used in any of the recent instruments for obtaining general trauma history information (Norris & Hamblen, Chapter 3, this volume). Rather, detailed questions about specific behaviors are required to learn whether certain of these experiences have occurred (Resnick et al., 1996). Furthermore, individuals or patients will not necessarily volunteer information about specific events to open-ended questions ("has anything terrible, frightening, etc., ever happened to you?") nor respond to list of possible examples of events with events *not* on the list. Again, this suggests the importance of asking about each important event. The most efficient strategy would be to employ one of the self-report measures reviewed by Norris and Hamblen (Chapter 3, this volume), or others (e.g., Kriegler et al., 1992; MacIan & Pearlman, 1992) to query for a *range* of events. Self-report inquiry requires no physician time (a receptionist can include the form in an intake packet, although it may be appropriate to have the patient put it into a sealed envelope on completion). The use made of such a measure would be up to the individual physician. He or she would have the option of only reviewing the report, of asking the patient whether he or she wanted to discuss anything reported, or of asking additional questions about the events reported to get a clinical sense of their potential connection, psychologically or temporally, with the physical complaints or condition for which the patient has sought help. Self-report measures may be more comfortable for the physician, who may not be completely at ease inquiring about specific details of past abuse, especially in

the sexual arena. It is important to note, however, that it may be better not to ask at all if the questions are designed in such a way as to discourage reporting of emotionally salient experiences. Further, physicians need to be clear about how they will respond to such reports—by gathering more details, suggesting referral to mental health colleagues, and so forth. Often the most devastating aspect of early trauma is that others did not protect the person from trauma or abuse or denied or minimized the importance of what was reported. To repeat this in a medical setting would be very unhelpful as well.

Little is known at this time about screening for PTSD in primary care. Only a few studies have addressed this issue, although more are certainly under way. Studies in primary care have suggested that about 8–9% of individuals in primary care screen positive for PTSD (Stein et al., 2000; Krupnick, 2002). However, both of these studies found that universal screening for trauma and PTSD was a relatively low-yield endeavor in terms of those who followed through with full diagnostic assessments and treatment.

The field is beginning to develop short screening measures for PTSD with good sensitivity and specificity. In the Krupnick (2002) study, the 8-item screen developed by Breslau and colleagues (Breslau et al., 1999) was used to assess probable PTSD. Participants were rescreened 1 or 2 weeks later. Of those who rescreened positive, all but 1 met criteria for PTSD at clinical interview, indicating good validity for the screener and suggesting that sequential screening was an excellent way to identify PTSD.

Overall, it seems important to develop better approaches to screening and referral for patients with trauma exposure and PTSD seen in non-mental-health settings, especially relatively short screening questions for interviews or questionnaires for primary care settings. If physicians want to include a few trauma history questions in their screening, we urge them to ask inclusive questions that do not “label” the behavior with such terms as “rape” and “abuse” (Resnick et al., 1996). We recommend separate questions for sexual trauma, physical trauma (including examples of parents and spouse), serious accident, serious illness, and combat.

Going forward, it seems important to be clear about the purposes of screening for trauma and for PTSD. These would include, but not be limited to, intervention for current violence (e.g., reporting to authorities), helping providers and patients understand better the patient’s current health picture, and determining whether the patient needs mental health treatment and whether he or she is psychologically ready to accept the diagnosis and the need for treatment.

## SUMMARY

In recent years, dozens of studies have examined the connections between trauma, PTSD, and physical health from a variety of angles. In short, the most prominent research areas investigated include: (1) How trauma and PTSD

play a role in instigating poor physical health, and (2) how medical diagnoses and interventions can serve as criterion A stressors that precipitate a PTSD diagnosis. The extant data suggest that trauma, and PTSD more specifically, do indeed raise the risk of individuals engaging in a profile of unhealthy lifestyle habits that increases the risk for physical morbidity. In addition, the physiological disturbances common to the disorder also seem to put individuals at increased health risk. These two factors drive an increased morbidity rate and a concomitant increase in health-care utilization, making PTSD a burden to the health-care system. Medical diagnoses and events such as cancer diagnosis and onset of myocardial infarctions can serve as criterion A stressors that lead to PTSD. Fortunately, the prevalence rates of PTSD subsequent to these events is low. However, careful attention is warranted in cases in which such distress may be present as psychiatric disturbance related to the index medical diagnosis can adversely affect the medical outcome and create impairment in the psychosocial aspects of a patient's life. These two ways in which PTSD relates to medical morbidity require that clinicians and researchers broaden their scope of focus beyond that of traditional psychiatric symptoms and examine PTSD in the context of an individual's entire mental and physical health profile.

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